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**Bibliography**

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**Summary**

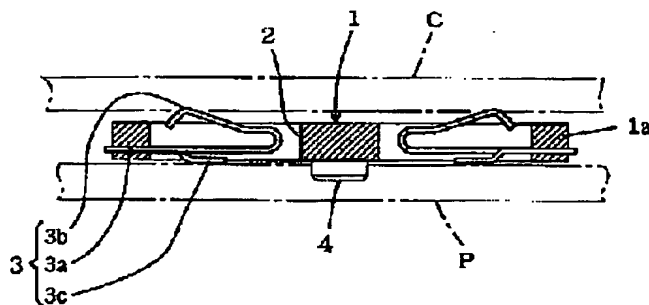
(57) [Abstract]

[Technical problem] Performing a surface mount certainly by storing an end-connection child's lead section in housing by plane view, the component-side product to a printed wired board is sharply made small, and the connector for printed wired boards which can realize the miniaturization of a device is offered.

[Means for Solution] While contact section 3b by which the window part 2 has been arranged corresponding to the housing 1 of the tabular which carried out opening, and this window part, was equipped with the end-connection child 3 fixed to housing, and was formed in this end-connection child is constituted so that elastic deformation can be carried out in the housing thickness direction near the housing upper surface of a window part. The connector for printed wired boards to which an end-connection child's lead section 3c is characterized by being prepared into the above-mentioned window part by plane view.

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**CLAIMS**

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[Claim(s)]

[Claim 1] The connector for printed wired boards to which an end-connection child's lead section is characterized by being prepared into the above-mentioned window part by plane view while the contact section by which the window part has been arranged corresponding to housing of the tabular which carried out opening, and this window part, was equipped with the end-connection child fixed to housing, and was formed in this end-connection child is constituted so that elastic deformation can be carried out in the housing thickness direction near the housing upper surface of a window part.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to improvement of the connector for printed wired boards used in order to make

connection of connection of for example, printed wired boards or a printed wired board, a SIM card, etc.

[0002]

[Description of the Prior Art] conventionally, it is shown in drawing 6 as such a connector -- as -- receipt -- the housing 51 of the tabular in which the hole 52 carried out opening, and this receipt -- the end-connection child 53 stationed at the hole 52, respectively -- the thing equipped with .. is known (see JP,8-321353,A) this end-connection child 53 -- halfway section 53a -- receipt -- a hole -- it fixes to the housing portion of a rim -- having -- \*\*\*\* -- an inner edge -- receipt -- it curves in the shape of an abbreviation HE character in a hole, and contact section 53b is formed, and an outer edge is prolonged in the method of an outside of housing 51, and forms lead section 53c In the above-mentioned lead section 53c, the surface mount of this connector is carried out to a printed wired board 54. A pressure welding is carried out to the contact sections of 55, such as a printed wired board or a SIM card of the other party, because the above-mentioned contact section 53b carries out elastic deformation in the housing thickness direction (drawing 6 (b) the vertical direction). It is made to achieve mechanical connections and electrical installation by this between printed wired boards (henceforth a substrate pair substrate) or a printed wired board, a SIM card (henceforth a substrate pair card), etc. A SIM card, a PC card, and an IC card are contained in a SIM card here.

[0003]

[Problem(s) to be Solved by the Invention] Much more miniaturization is called for by the device which is making connection of a substrate pair substrate or a substrate pair card using such a connector, and the miniaturization is strongly demanded on the property especially by the pocket device illustrated with a cellular phone, a digital storage camcorder/movie, etc.

[0004] The place made into the purpose of this invention is to make small sharply the component-side product to a printed wired board, and offer the connector for printed wired boards which can realize the miniaturization of a device, performing a surface mount certainly by storing an end-connection child's lead section in housing by plane view.

[0005]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the connector for printed wired boards of this invention A window part is arranged corresponding to housing of the tabular which carried out opening, and this window part. While the contact section which was equipped with the end-connection child fixed to housing, and was formed in this end-connection child is constituted so that elastic deformation can be carried out in the housing thickness direction near the housing upper surface of a window part An end-connection child's lead section is characterized by being prepared into the above-mentioned window part by plane view.

[0006] The pressure welding of this connector is carried out to the contact sections,

such as a printed wired board of the other party, or a SIM card, because a surface mount is carried out to a printed wired board in the lead section and the contact section carries out elastic deformation in the housing thickness direction, and it achieves mechanical connections and electrical installation with a substrate pair substrate or a substrate pair card by this. In this case, since an end-connection child's lead section is prepared in the above-mentioned window part by plane view, the occupancy area to a printed wired board becomes small, and a component-side product becomes small sharply and contributes to the miniaturization of a device. Moreover, since the lead section is exposed in a window part by plane view, when performing reflow soldering, for example, heating of the lead section becomes easy and a surface mount is performed certainly.

[0007]

[Embodiments of the Invention] Hereafter, the gestalt of operation of this invention is explained based on a drawing. Drawing 1 - drawing 4 show the connector for printed wired boards concerning the 1st operation gestalt. This connector connects SIM card C of GSM specification which was inserted in printed wired board P built in the cellular phone, and the cellular phone, for example, memorized personal data, and can call it the connector for substrate pair card connection.

[0008] housing of a tabular with which 1 was formed by insulating materials, such as a heat resistant resin, in these drawings -- it is -- this housing 1 -- two-line three trains -- a total of six window parts 2 .. is carrying out opening And the end-connection child 3 to whom it became from the copper alloy and gold plate etc. was performed if needed is stationed at each of this window part 2, respectively. It is the so-called bellows type, it is fixed to housing 1 by outer edge 3a being embedded at housing partial 1a of a window part rim, and after an inner edge curves in the shape of abbreviation for U characters up in a window part 2, this end-connection child 3 curves in the shape of an abbreviation HE character further near the housing upper surface, and forms contact section 3b. Contact section 3b has come to be able to carry out elastic deformation in the housing thickness direction (the vertical direction of drawing 1 ) near the housing upper surface of a window part 2 by this composition by the elastic deformation for the cantilever portion from housing partial 1a, and a U character-like bend.

[0009] And lead section 3c is prepared for each above-mentioned end-connection child 3, respectively. As shown in drawing 2 , this lead section 3c is prepared in the window part 2 by plane view. As it has branched from the end-connection child's 3 fixed-end 3a so that it may shift horizontally to contact section 3b in plane view, if it furthermore explains to a detail, and shown in drawing 1 , after branching, the above-mentioned lead section 3c is going caudad, when a connector is laid on a printed wired board, becomes flat-tapped with the base of housing 1 mostly, and approaches or contacts printed wired board P. Although this lead section 3c is the so-called gal wing type, the configuration of the lead section of this invention may not be limited to this, and may be the so-called bat lead type, J bend type, etc. As

shown in drawing 2 , it is the two-line 3 \*\*\*\*\* end-connection child 3.. While contact section 3b of each train and 3b counter on the same line in inside and being arranged, it is located in the anterior of contact section 3b in the right-hand side line, and lead section 3c is located in the posterior of contact section 3b by lead section 3c in the left-hand side line. thus — if it arranges — six contact sections 3b — the press force from SIM card C which .. receives, and lead section 3c — although it is desirable since the reaction force from printed wired board P which .. receives balances, it is an arbitrary matter whether it arranges in this way In addition, 4 and 4 are salients prepared in the base of housing 1 if needed, and they position by fitting into the tooling holes of printed wired board P.

[0010] The pressure welding of the above-mentioned connector is carried out to the contact section of SIM card C inserted in a cellular phone because a surface mount is carried out to printed wired board P built in the cellular phone in lead section 3c and contact section 3b carries out elastic deformation in the housing thickness direction, and it achieves mechanical connections and electrical installation with a substrate pair substrate or a substrate pair card by this. The type with which opposite arrangement of the SIM card C is carried out with an abbreviation parallel relation to printed wired board P by inserting SIM card C in the slot formed in housing of a cellular phone here, for example if the desorption structure to the cellular phone of SIM card C is illustrated, Near the contact section of printed wired board P is exposed by having bounded the lid of housing of a cellular phone, as for reliance, SIM card C is here, and the type with which opposite arrangement of the SIM card C is carried out with an abbreviation parallel relation to printed wired board P by shutting a lid is mentioned. In this case, when it slides SIM card C stuffing this into the inner direction of a window part 2 in contact section 3b of a connector and comes to a plug completion position by the former type, the contact section of SIM card C carries out a pressure welding to contact section 3b of a connector. Moreover, after the contact section of SIM card C has contacted contact section 3b of a connector by the latter type, the contact section of SIM card C carries out a pressure welding to contact section 3b of a connector according to the closing force of a lid.

[0011] Therefore, with this 1st operation gestalt, since the end-connection child's 3 lead section 3c is prepared in the above-mentioned window part 2 by plane view, the occupancy area to printed wired board P becomes small, and a component-side product becomes small sharply and can realize the miniaturization of a cellular phone. Moreover, since lead section 3c is exposed in a window part 2 by plane view, when performing reflow soldering, for example, heating of lead section 3c becomes easy, and a surface mount is performed certainly. Especially, like this operation gestalt, in lead section 3c, since the heat from the upper part tends to hit near lead section 3c directly and efficiently when it branches from the end-connection child's 3 fixed-end 3a so that it may shift horizontally to contact section 3b in plane view, heating of lead section 3c is promoted further, and a surface mount is performed more

certainly.

[0012] Drawing 5 shows the 2nd operation gestalt and only the configurations near an end-connection child's contact section differ compared with the 1st operation gestalt. That is, with this operation gestalt, it is fixed to housing 1 by the end-connection child's 3 outer edge 3a being fixed to housing partial 1a of a window part rim, and an inner edge curves in the shape of an abbreviation HE character near the housing upper surface in a window part 2, and forms contact section 3b. This contact section 3b has come to be able to carry out elastic deformation in the housing thickness direction (the vertical direction of drawing 5 ) near the housing upper surface of a window part 2 by the elastic deformation of the cantilever portion from housing partial 1a by this composition. Since the other composition, the operation, and the effect are completely the same as the 1st operation gestalt, the same sign is attached and description of the 1st operation gestalt is quoted as it is.

[0013] In addition, with the above-mentioned operation gestalt, although the window part and the end-connection child were set to a total of six in two-line three trains, thereby, the number of the window part of this invention and end-connection children and arrangement are not limited. Moreover, the composition near an end-connection child's contact section is not limited to the type illustrated with each above-mentioned operation gestalt, and if it is constituted so that the elastic deformation of the contact section can be carried out in the housing thickness direction near the housing upper surface of a window part, it can apply this invention. Furthermore, although the above-mentioned operation gestalt was illustrated by the connector which embedded the end-connection child's 3 outer edge 3a at housing partial 1a of a window part rim, this invention is applicable also to the connector which the upper surface of the end-connection child's 3 outer edge 3a really comes to join to the base of the above-mentioned housing partial 1a by the method of molding, adhesion, and others. Moreover, although connection of a substrate pair card was illustrated with the above-mentioned operation gestalt by printed wired board P and SIM card C in a cellular phone, this invention can be widely used to connection of the substrate pair substrate in various devices or a substrate pair card, and not only a SIM card but a PC card, an IC card, etc. are contained in the card in that case. Moreover, as a connection partner, a battery pack etc. is mentioned besides these printed wired boards, a SIM card, etc., and all the media by which, performing a printed wired board, mechanical connections, and electrical installation in the contact section in short is called for are contained.

[0014]

[Effect of the Invention] As explained above, the connector for printed wired boards of this invention Since an end-connection child's lead section was prepared into the housing window part by plane view Performing certainly the surface mount to the printed wired board of a connector in connection of a substrate pair substrate or a substrate pair card It is very effective, when promoting the miniaturization of the pocket device which can realize the miniaturization of a device and is especially

illustrated by a cellular phone, the digital storage camcorder/movie, etc., since the component-side product to a printed wired board can be sharply made small.

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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1] It is the A-A line cross section of the 1st operation gestalt shown in drawing 2 .

[Drawing 2] It is the plan of the 1st operation gestalt.

[Drawing 3] It is the front view of the 1st operation gestalt.

[Drawing 4] It is the left lateral view of the 1st operation gestalt.

[Drawing 5] It is the drawing 1 equivalent view of the 2nd operation gestalt.

[Drawing 6] The conventional example is shown, (a) is a plan and (b) is the B-B line cross section.

[Description of Notations]

P Printed wired board

C SIM cards (SIM card etc.)

1 Housing

2 Window Part

3 End-Connection Child

3a Fixed end (outer edge)

3b Contact section

3c Lead section

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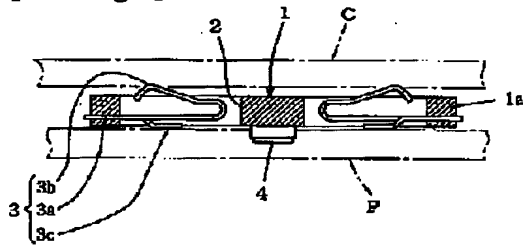
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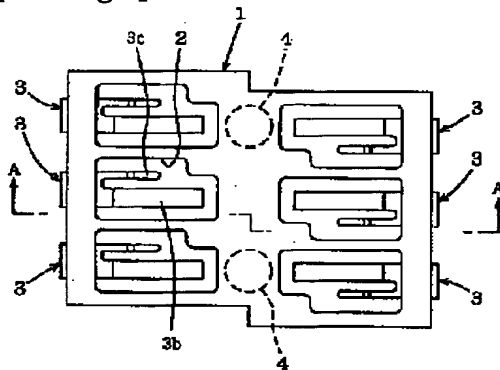
## DRAWINGS

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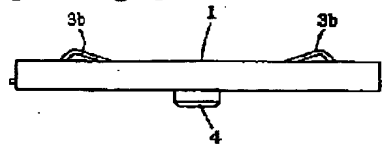
[Drawing 1]



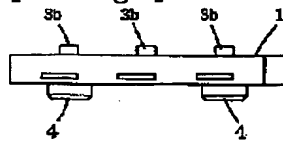
[Drawing 2]



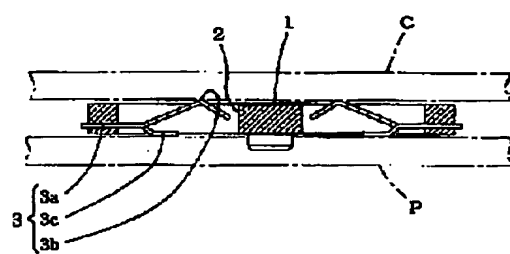
[Drawing 3]



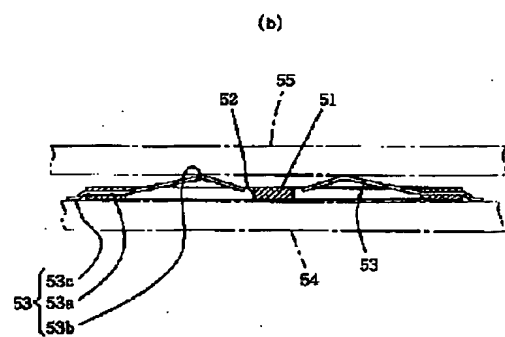
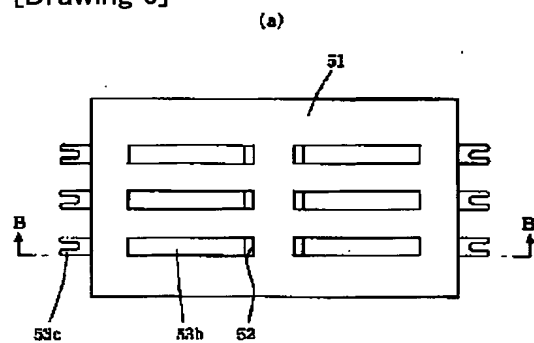
[Drawing 4]



[Drawing 5]



[Drawing 6]



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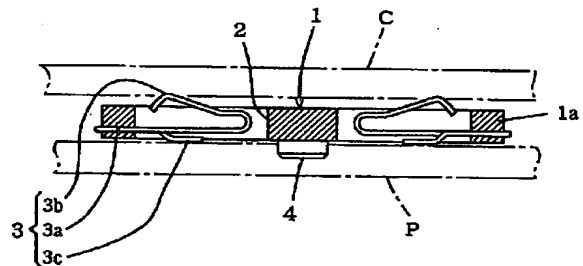
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(54) 【発明の名称】 プリント配線板用コネクタ

(57) 【要約】

【課題】 接続端子のリード部を平面視でハウジング内に収めることにより、表面実装を確実にしながら、プリント配線板への実装面積を大幅に小さくして、機器の小型化を実現できるプリント配線板用コネクタを提供する。

【解決手段】 窓部2が開口した板状のハウジング1と、この窓部に対応して配置され、ハウジングに固定された接続端子3とを備え、この接続端子に形成された接触部3bが、窓部のハウジング上面付近でハウジング厚さ方向に弾性変形できるように構成されていると共に、接続端子のリード部3cが、平面視で上記窓部のなかに設けられていることを特徴とするプリント配線板用コネクタ。



## 【特許請求の範囲】

【請求項1】 窓部が開口した板状のハウジングと、この窓部に対応して配置され、ハウジングに固定された接続端子とを備え、この接続端子に形成された接触部が、窓部のハウジング上面付近でハウジング厚さ方向に弾性変形できるように構成されていると共に、接続端子のリード部が、平面視で上記窓部のなかに設けられていることを特徴とするプリント配線板用コネクタ。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、例えばプリント配線板同士の接続、又はプリント配線板とSIMカード等との接続を実現するために用いられるプリント配線板用コネクタの改良に関する。

## 【0002】

【従来の技術】従来、このようなコネクタとして、例えば図6に示すように、収納孔52が開口した板状のハウジング51と、この収納孔52にそれぞれ配置された接続端子53・・・とを備えたものが知られている（例えば、特開平8-321353号公報を参照）。この接続端子53は、中途部53aが収納孔外縁のハウジング部分に固定されており、内端が収納孔のなかに略へ字状に湾曲して接触部53bを形成しており、外端がハウジング51の外側方に延びてリード部53cを形成している。このコネクタは、上記リード部53cにおいてプリント配線板54に表面実装され、上記接触部53bがハウジング厚さ方向（図6（b）では上下方向）に弾性変形することで相手側のプリント配線板又はSIMカード等55の接触部に圧接し、これによってプリント配線板同士（以下、基板対基板という）又はプリント配線板とSIMカード等との間（以下、基板対カードという）で機械的接続及び電気的接続を果たすようにしている。ここでいうSIMカード等にはSIMカード、PCカード、ICカードが含まれる。

## 【0003】

【発明が解決しようとする課題】このようなコネクタを用いて基板対基板又は基板対カードの接続を行っている機器では一層の小型化が求められており、特に携帯電話、デジタル記録カメラ一体型VTRなどで例示される携帯機器では、その性質上、小型化が強く要望されている。

【0004】本発明の目的とするところは、接続端子のリード部を平面視でハウジング内に収めることにより、表面実装を確実にしながら、プリント配線板への実装面積を大幅に小さくして、機器の小型化を実現できるプリント配線板用コネクタを提供することにある。

## 【0005】

【課題を解決するための手段】上記目的を達成するため、本発明のプリント配線板用コネクタは、窓部が開口した板状のハウジングと、この窓部に対応して配置さ

れ、ハウジングに固定された接続端子とを備え、この接続端子に形成された接触部が、窓部のハウジング上面付近でハウジング厚さ方向に弾性変形できるように構成されていると共に、接続端子のリード部が、平面視で上記窓部のなかに設けられていることを特徴としている。

【0006】このコネクタは、リード部においてプリント配線板に表面実装され、接触部がハウジング厚さ方向に弾性変形することで相手側のプリント配線板又はSIMカード等の接触部に圧接し、これによって基板対基板又は基板対カードで機械的接続及び電気的接続を果たす。その場合、接続端子のリード部が、平面視で上記窓部のなかに設けられているので、プリント配線板に対する占有面積が小さくなり、実装面積が大幅に小さくなり、機器の小型化に寄与する。また、平面視でリード部が窓部のなかで露出しているため、例えばリフローハンダ付けを行うときに、リード部の加熱が容易となり、表面実装が確実に行われる。

## 【0007】

【発明の実施の形態】以下、本発明の実施の形態を図面に基いて説明する。図1～図4は第1の実施形態に係るプリント配線板用コネクタを示す。このコネクタは、携帯電話に内蔵されたプリント配線板Pと、携帯電話に差し込まれ、例えば個人データを記憶したGSM規格のSIMカードCとを接続するものであり、基板対カード接続用のコネクタといえる。

【0008】これらの図において、1は例えば耐熱性樹脂等の絶縁材で形成された板状のハウジングであって、このハウジング1には2行3列で合計6つの窓部2・・・が開口している。そして、この各窓部2には、例えば銅合金よりなり必要に応じて金メッキ等が施された接続端子3がそれぞれ配置されている。この接続端子3は、いわゆるペローズ・タイプであって、外端3aが窓部外縁のハウジング部分1aに埋め込まれることでハウジング1に固定されており、内端が窓部2のなかに上方に略U字状に湾曲してからハウジング上面付近で更に略へ字状に湾曲して接触部3bを形成している。この構成により、接触部3bは、ハウジング部分1aからの片持ち部分、及びU字状湾曲部分の弾性変形により、窓部2のハウジング上面付近でハウジング厚さ方向（図1の上下方向）に弾性変形できるようになっている。

【0009】そして、上記各接続端子3には、リード部3cがそれぞれ設けられている。図2に示すように、このリード部3cは、平面視で窓部2のなかに設けられている。さらに詳細に説明すると、上記リード部3cは、平面視で接触部3bに対して横にずれるように接続端子3の固定端3aから分岐しており、図1に示すように、分岐してから下方に向かうことで、コネクタをプリント配線板上に載置したときに、ほぼハウジング1の底面と面一となり、プリント配線板Pに接近又は接触するようになっている。このリード部3cは、いわゆるガルウィ

ング・タイプであるが、本発明のリード部の形状はこれに限定されるものではなく、いわゆるバットリード・タイプ、Jベンド・タイプ等であってもよい。図2に示すように、2行3列ある接続端子3・・のなかで、各列の接触部3b、3b同士は同一線上に対向して配置されていると共に、右側の行ではリード部3cが接触部3bの前側に、左側の行ではリード部3cが接触部3bの後側に位置している。このように配置すれば、6つの接触部3b・・が受けるSIMカードCからの押圧力と、リード部3c・・が受けるプリント配線板Pからの反力がバ

ランスするので好ましいが、このように配置するか否かは任意事項である。なお、4、4は、必要に応じてハウジング1の底面に設けられる突起であり、プリント配線板Pの位置決め孔に嵌合することで位置決めを行うものである。

【0010】上記コネクタは、リード部3cにおいて携帯電話に内蔵されたプリント配線板Pに表面実装され、接触部3bがハウジング厚さ方向に弾性変形することで携帯電話に差し込まれるSIMカードCの接触部に圧接し、これによって基板対基板又は基板対カードで機械的

接続及び電気的接続を果たす。ここで、SIMカードCの携帯電話への脱着構造を例示すると、例えばSIMカードCを携帯電話のハウジングに形成されたスロットに差し込むことでSIMカードCがプリント配線板Pに対して略平行関係をもって対向配置されるタイプ、携帯電話のハウジングの蓋を跳ね上げることでプリント配線板Pの接触部付近を露出させ、ここにSIMカードCを当てがい、蓋を閉めることでSIMカードCがプリント配線板Pに対して略平行関係をもって対向配置されるタイプなどが挙げられる。その場合、前者のタイプではSIMカードCがコネクタの接触部3bに当たってこれを窓部2の内方に押し込みつつスライドし、差し込み完了位置にきたときにSIMカードCの接触部がコネクタの接触部3bに圧接する。また、後者のタイプではSIMカードCの接触部がコネクタの接触部3bに接触した状態で蓋の閉じ力によりSIMカードCの接触部がコネクタの接触部3bに圧接する。

【0011】従って、この第1実施形態では、接続端子3のリード部3cが、平面視で上記窓部2のなかに設けられているので、プリント配線板Pに対する占有面積が小さくなり、実装面積が大幅に小さくなり、携帯電話の小型化を実現することができる。また、平面視でリード部3cが窓部2のなかに露出しているため、例えばリフローハンダ付けを行うときに、リード部3cの加熱が容易となり、表面実装が確実に行われる。特に、この実施形態のようにリード部3cを、平面視で接触部3bに対して横にずれるように接続端子3の固定端3aから分岐したときには、上方からの熱がリード部3c付近に直接、且つ効率良く当たりやすいので、リード部3cの加熱が一層促進され、表面実装がより確実に行われる。

【0012】図5は第2実施形態を示し、第1実施形態に較べて接続端子の接触部付近の形状のみが異なっている。すなわち、この実施形態では、接続端子3の外端3aが窓部外縁のハウジング部分1aに固定されることでハウジング1に固定されており、内端が窓部2のなかのハウジング上面付近で略へ字状に湾曲して接触部3bを形成している。この構成により、この接触部3bは、ハウジング部分1aからの片持ち部分の弾性変形により、窓部2のハウジング上面付近でハウジング厚さ方向（図5の上下方向）に弾性変形できるようにになっている。それ以外の構成、作用及び効果は第1実施形態と全く同一であるので、同一の符号を付して第1実施形態の解説をそのまま引用する。

【0013】なお、上記実施形態では窓部及び接続端子を2行3列で合計6つとしたが、これにより本発明の窓部及び接続端子の数及び配置が限定されるものではない。また、接続端子の接触部付近の構成は上記各実施形態で例示したタイプに限定されるものではなく、接触部が窓部のハウジング上面付近でハウジング厚さ方向に弾性変形できるように構成されておれば本発明を適用できる。さらに、上記実施形態は、接続端子3の外端3aを窓部外縁のハウジング部分1aに埋め込んだコネクタで例示したが、本発明は、例えば一体成型、接着その他の方法により接続端子3の外端3aの上面が上記ハウジング部分1aの底面に接合してなるコネクタにも適用できる。また、上記実施形態では携帯電話におけるプリント配線板PとSIMカードCとにより基板対カードの接続を例示したが、本発明は各種機器における基板対基板又は基板対カードの接続に対して広く用いることができ、その場合のカードには、SIMカードのみならずPCカード、ICカード等が含まれる。また、接続相手としては、これらプリント配線板やSIMカード等以外にもバッテリーバックなどが挙げられ、要は接触部においてプリント配線板と機械的接続及び電気的接続を行うことが求められるあらゆる媒体が含まれる。

【0014】

【発明の効果】以上説明したように、本発明のプリント配線板用コネクタは、接続端子のリード部を、平面視でハウジング窓部のなかに設けたので、基板対基板又は基板対カードの接続にあたり、コネクタのプリント配線板への表面実装を確実にいながら、プリント配線板への実装面積を大幅に小さくできることから、機器の小型化を実現することができ、特に携帯電話、デジタル記録カメラ一体型VTRなどに例示される携帯機器の小型化を推進する上で極めて効果的である。

【図面の簡単な説明】

【図1】図2に示した第1実施形態のA-A線断面図である。

【図2】第1実施形態の平面図である。

【図3】第1実施形態の正面図である。

【図4】第1実施形態の左側面図である。

【図5】第2実施形態の図1相当図である。

【図6】従来例を示し、(a)は平面図、(b)はそのB-B線断面図である。

【符号の説明】

P プリント配線板

C SIMカード(SIMカード等)

\* 1 ハウジング

2 窓部

3 接続端子

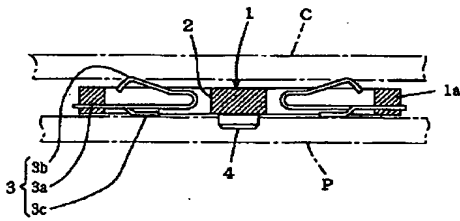
3a 固定端(外端)

3b 接触部

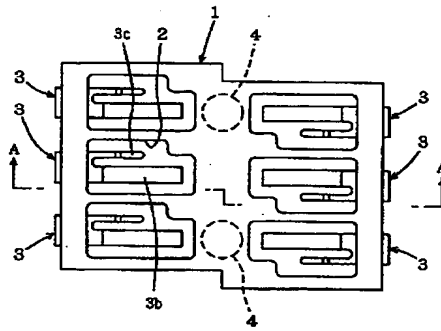
3c リード部

\*

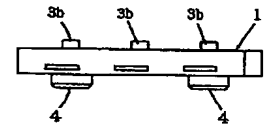
【図1】



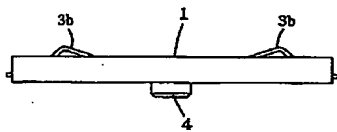
【図2】



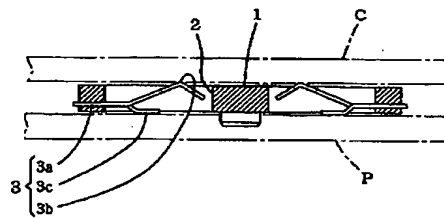
【図4】



【図3】



【図5】



【図6】

